WHAT IS CLAIMED IS:

1. A method of inducing biomineralization in a tissue, which method comprises administering to the tissue a source of Phosphophoryn (PP) in an amount sufficient to induce biomineralization in the tissue.

2. The method of claim 1, wherein the source of PP is a PP protein having or comprising the amino acid sequence of SEQ ID NO: 1, a fragment thereof, or a derivative of either of the foregoing.

3. The method of claim 2, wherein the fragment of a PP protein has or comprises the amino acid sequence of SEQ ID NO: 2.

4. The method of claim 1, wherein the source of PP is a nucleic acid molecule encoding a PP protein (SEQ ID NO: 1), a fragment thereof, or a derivative of either of the foregoing, wherein the nucleic acid molecule is optionally in the form of an expression vector.

5. The method of claim 4, wherein the nucleic acid molecule encoding the PP protein has or comprises the nucleotide sequence of SEQ ID NO: 3.

6. The method of claim 4, wherein the nucleic acid molecule encoding the PP protein has or comprises the nucleotide sequence of SEQ ID NO: 4.

7. The method of claim 4, wherein the tissue is pulp tissue and the nucleic acid molecule encoding a PP protein, a fragment thereof, or a derivative of either of the foregoing is administered to a cell of the pulp tissue.

8. The method of any of the preceding claims, wherein the tissue is in a mammal.

9. The method of claim 8, wherein the mammal is a human.

10. The method of any of the preceding claims, wherein the source of PP is administered in combination with another osteogenic factor or a growth factor.

11. The method of claim 10, wherein the other osteogenic factor or the growth factor is a Bone Morphogenic Protein (BMP), Latent Membrane Protein-3 (LMP-3), a

Platelet-Derived Growth Factor (PDGF), an Insulin Growth Factor (IGF), a Vascular Endothelial Growth Factor (VEGF), RunX, Osterix (Osx), or a Fibroblast Growth Factor (FGF).

12. The method of any of the preceding claims, wherein the source of PP is formulated in a toothpaste, an oral rinse, a chewing gum, a dissolvable tablet, a dissolvable film, a gel, a natural biodegradable polymer, a synthetic biodegradable polymer, or a non-biodegradable polymer.

13. The method of any of the preceding claims, wherein the method treats tooth sensitivity or injured pulp tissue.

14. A method of treating tooth sensitivity or injured pulp tissue in a mammal, which method comprises administering to the mammal a source of PP in an amount sufficient to treat tooth sensitivity or injured pulp tissue.

15. The method of claim 14, wherein the source of PP is a PP protein having or comprising the amino acid sequence of SEQ ID NO: 1, a fragment thereof, or a derivative of either of the foregoing.

16. The method of claim 15, wherein the fragment of a PP protein has or comprises the amino acid sequence of SEQ ID NO: 2.

17. The method of claim 14, wherein the source of PP is a nucleic acid molecule encoding a PP protein (SEQ ID NO: 1), a fragment thereof, or a derivative of either of the foregoing, wherein the nucleic acid molecule is optionally in the form of an expression vector.

18. The method of claim 17, wherein the nucleic acid molecule encoding the PP protein has or comprises the nucleotide sequence of SEQ ID NO: 3.

19. The method of claim 17, wherein the nucleic acid molecule encoding the PP protein has or comprises the nucleotide sequence of SEQ ID NO: 4.

20. The method of claim 17, wherein the mammal has pulp tissue and the nucleic acid molecule encoding a PP protein, a fragment thereof, or a derivative of either of the foregoing is administered to a cell of the pulp tissue.

21. The method of any of the preceding claims, wherein the mammal is a human.

22. The method of any of the preceding claims, wherein the source of PP is administered in combination with another osteogenic factor or a growth factor.

23. The method of claim 22, wherein the other osteogenic factor or the growth factor is a BMP, LMP-3, a PDGF, an IGF, a VEGF, RunX, Osx, or an FGF.

24. The method of any of claims 14-23, wherein the source of PP is formulated in a toothpaste, an oral rinse, a chewing gum, a dissolvable tablet, a dissolvable film, a gel, a natural biodegradable polymer, a synthetic biodegradable polymer, or a non-biodegradable polymer, optionally in combination with a calcium phosphate.

25. A method of inducing differentiation of a cell into an osteogenic cell or an odontogenic cell, which method comprises administering to the cell a source of PP in an amount sufficient to induce differentiation of the cell into an osteogenic cell or an odontogenic cell.

26. The method of claim 25, wherein the source of PP is a PP protein having or comprising the amino acid sequence of SEQ ID NO: 1, a fragment thereof, or a derivative of either of the foregoing.

27. The method of claim 26, wherein the fragment of a PP protein has or comprises the amino acid sequence of SEQ ID NO: 2.

28. The method of claim 25, wherein the source of PP is a nucleic acid molecule encoding a PP protein (SEQ ID NO: 1), a fragment thereof, or a derivative of the foregoing, wherein the nucleic acid molecule is optionally in the form of an expression vector.

29. The method of claim 28, wherein the nucleic acid molecule encoding the PP protein has or comprises the nucleotide sequence of SEQ ID NO: 3.

30. The method of claim 28, wherein the nucleic acid molecule encoding the PP protein has or comprises the nucleotide sequence of SEQ ID NO: 4.

31. The method of claim 28, wherein the cell is a stem cell and the nucleic acid molecule encoding a PP protein, a fragment thereof, or a derivative of either of the foregoing is administered to the stem cell.

32. The method of any of claims 25-31, wherein the cell is in a mammal.

33. The method of claim 32, wherein the mammal is a human.

34. The method of any of claims 25-33, wherein the method effectively induces bone regeneration.

35. The method of any of claims 25-34, wherein the cell is a stem cell.

36. The method of any of claims 25-34, wherein the cell is a fibroblast cell.

37. The method of any of the preceding claims, wherein the source of PP is administered in combination with another osteogenic factor or a growth factor.

38. The method of claim 37, wherein the other osteogenic factor or the growth factor is a BMP, LMP-3, a PDGF, an IGF, a VEGF, RunX, Osx, or an FGF.

39. The method of any of claims 25-38, wherein the source of PP is formulated in a toothpaste, an oral rinse, a chewing gum, a dissolvable tablet, a dissolvable film, a gel, a natural biodegradable polymer, a synthetic biodegradable polymer, or a non-biodegradable polymer.

40. A method of inducing bone or dentin regeneration in a tissue, which method comprises administering to the tissue a source of PP in an amount sufficient to induce bone or dentin regeneration in the tissue.

41. The method of claim 40, wherein the source of PP is a PP protein having or comprising the amino acid sequence of SEQ ID NO: 1, a fragment thereof, or a derivative of either of the foregoing.

42. The method of claim 41, wherein the fragment of a PP protein has or comprises the amino acid sequence of SEQ ID NO: 2.

43. The method of claim 40, wherein the source of PP is a nucleic acid molecule encoding a PP protein (SEQ ID NO: 1), a fragment thereof, or a derivative of either of the foregoing; wherein the nucleic acid molecule is optionally in the form of an expression vector.

44. The method of claim 43, wherein the nucleic acid molecule encoding the PP protein has or comprises the nucleotide sequence of SEQ ID NO: 3.

45. The method of claim 43, wherein the nucleic acid molecule encoding the PP protein has or comprises the nucleotide sequence of SEQ ID NO: 4.

46. The method of claim 43, wherein the mammal has a stem cell and the nucleic acid molecule encoding a PP protein, a fragment thereof, or a derivative of either of the foregoing is administered to the stem cell of the mammal.

47. The method of any of claims 40-47, wherein the tissue is in a mammal.

48. The method of claim 47, wherein the mammal is a human.

49. The method of any of claims 40-48, wherein the source of PP is administered in combination with another osteogenic factor or a growth factor.

50. The method of claim 49, wherein the other osteogenic factor or the growth factor is a BMP, LMP-3, a PDGF, an IGF, a VEGF, RunX, Osx, or an FGF.

51. The method of any of claims 40-50, wherein the source of PP is formulated in a toothpaste, an oral rinse, a chewing gum, a dissolvable tablet, a dissolvable film, a gel, a natural biodegradable polymer, a synthetic biodegradable polymer, or a non-biodegradable polymer.

52. A method of inducing periodontal regeneration in a tissue, which method comprises administering to the tissue a source of PP in an amount sufficient to induce periodontal regeneration in the tissue.

53. The method of claim 52, wherein the amount is sufficient to induce regeneration of the cementum, bone, periodontal ligament, or a combination thereof.

54. The method of claim 52, wherein the source of PP is a PP protein having or comprising the amino acid sequence of SEQ ID NO: 1, a fragment thereof, or a derivative of either of the foregoing.

55. The method of claim 54, wherein the fragment of a PP protein has or comprises the amino acid sequence of SEQ ID NO: 2.

56. The method of claim 52, wherein the source of PP is a nucleic acid molecule encoding a PP protein (SEQ ID NO: 1), a fragment thereof, or a derivative of either of the foregoing; wherein the nucleic acid molecule is optionally in the form of an expression vector.

57. The method of claim 56, wherein the nucleic acid molecule encoding the PP protein has or comprises the nucleotide sequence of SEQ ID NO: 3.

58. The method of claim 56, wherein the nucleic acid molecule encoding the PP protein has or comprises the nucleotide sequence of SEQ ID NO: 4.

59. The method of claim 56, wherein the mammal has a stem cell and the nucleic acid molecule encoding a PP protein, a fragment thereof, or a derivative of either of the foregoing is administered to the stem cell of the mammal.

60. The method of any of claims 52-59, wherein the tissue is in a mammal.

61. The method of claim 60, wherein the mammal is a human.

62. The method of any of claims 52-59, wherein the source of PP is administered in combination with another osteogenic factor or a growth factor.

63. The method of claim 62, wherein the other osteogenic factor or the growth factor is a BMP, LMP-3, a PDGF, an IGF, a VEGF, RunX, Osx, or an FGF.

64. The method of any of claims 52-63, wherein the source of PP is formulated in a toothpaste, an oral rinse, a chewing gum, a dissolvable tablet, a dissolvable film, a gel, a natural biodegradable polymer, a synthetic biodegradable polymer, or a non-biodegradable polymer.

65. The method of any of claims 52-64, wherein the method effectively treats periodontitis.

66. A method of inducing differentiation of a cell into a cementoblast, osteoblast, or periodontal ligament cell, which method comprises administering to the cell or a periodontal space a source of PP in an amount sufficient to induce differentiation of the cell into a cementoblast, osteoblast, or periodontal ligament cell.

67. The method of claim 66, wherein the source of PP is a PP protein having or comprising the amino acid sequence of SEQ ID NO: 1, a fragment thereof, or a derivative of either of the foregoing.

68. The method of claim 67, wherein the fragment of a PP protein has or comprises the amino acid sequence of SEQ ID NO: 2.

69. The method of claim 66, wherein the source of PP is a nucleic acid molecule encoding a PP protein (SEQ ID NO: 1), a fragment thereof, or a derivative of the foregoing, wherein the nucleic acid molecule is optionally in the form of an expression vector.

70. The method of claim 69, wherein the nucleic acid molecule encoding the PP protein has or comprises the nucleotide sequence of SEQ ID NO: 3.

71. The method of claim 69, wherein the nucleic acid molecule encoding the PP protein has or comprises the nucleotide sequence of SEQ ID NO: 4.

72. The method of claim 69, wherein the cell is a stem cell and the nucleic acid molecule encoding a PP protein, a fragment thereof, or a derivative of either of the foregoing is administered to the stem cell.

73. The method of any of claims 66-72, wherein the cell is in a mammal.

74. The method of claim 73, wherein the mammal is a human.

75. The method of any of claim 66-74s, wherein the method effectively induces periodontal regeneration.

76. The method of any of claims 66-75, wherein the cell is a stem cell.

77. The method of any of claims 66-76, wherein the cell is a fibroblast cell.

78. The method of any of claims 66-77, wherein the source of PP is administered in combination with another osteogenic factor or a growth factor.

79. The method of claim 78, wherein the other osteogenic factor or the growth factor is a BMP, LMP-3, a PDGF, an IGF, a VEGF, RunX, Osx, or an FGF.

80. The method of any of claims 66-79, wherein the source of PP is formulated in a toothpaste, an oral rinse, a chewing gum, a dissolvable tablet, a dissolvable film, a gel, a natural biodegradable polymer, a synthetic biodegradable polymer, or a non-biodegradable polymer.

81. The method of any of claims 66-80, wherein the method effectively facilitates guided tissue regeneration.

82. The method of any of claims 66-81, wherein the method effectively treats periodontitis.

83. A composition comprising a source of PP and a carrier.

84. The composition of claim 83, wherein the composition is formulated into a toothpaste, an oral rinse, a chewing gum, a dissolvable tablet, a dissolvable film, a gel, a natural biodegradable polymer, a synthetic biodegradable polymer, or a non-biodegradable polymer.

85. The composition of claim 83, wherein the source of PP is a PP protein having the amino acid sequence of SEQ ID NO: 1, a fragment thereof, or a derivative of either of the foregoing.

86. The composition of claim 85, wherein the fragment of a PP protein has or comprises the amino acid sequence of SEQ ID NO: 2.

87. The composition of claim 83, wherein the source of PP is a nucleic acid molecule encoding a PP protein (SEQ ID NO: 1), a fragment thereof, or a derivative of either

of the foregoing, wherein the nucleic acid molecule is optionally in the form of an expression vector.

88. The composition of claim 87, wherein the nucleic acid molecule encoding the PP protein has or comprises the nucleotide sequence of SEQ ID NO: 3.

89. The composition of claim 87, wherein the nucleic acid molecule encoding the PP protein has or comprises the nucleotide sequence of SEQ ID NO: 4.

90. The composition of any of claims 83-89, further comprising another osteogenic factor or a growth factor.

91. The composition of claim 90, wherein the other osteogenic factor is a BMP, LMP-3, a PDGF, an IGF, a VEGF, RunX, Osx, or an FGF.

92. The composition of any of claims 83-91, wherein the carrier is a biodegradable polymer, a biocompatible ceramic, or a combination thereof.

93. The composition of claim 92, wherein the biodegradable polymer is water soluble polymer or a non-water soluble polymer.

94. The composition of claim 93, wherein the water soluble polymer is polyethylene glycol, agarose, or alginate.

95. The composition of claim 93, wherein the non-water soluble polymer is polycaprolactone (PCL), polylactide (PLA), polyglycolic acid-lactic acid (PGLA), or a combination thereof.

96. The composition of claim 92, wherein the ceramic is selected from the group consisting of hydroxyapatite, substituted brushite, unsubstituted brushite, substituted tricalcium phosphate (TCP), unsubstituted TCP, amorphous calcium phosphate (ACP), or a combination thereof.

97. The composition of any of claims 89-96, wherein the composition is formulated into a paste, a gel, or a cream.

98. The composition of claim 97, wherein the gel has a molar calcium-phosphate ratio of about 10:3.

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